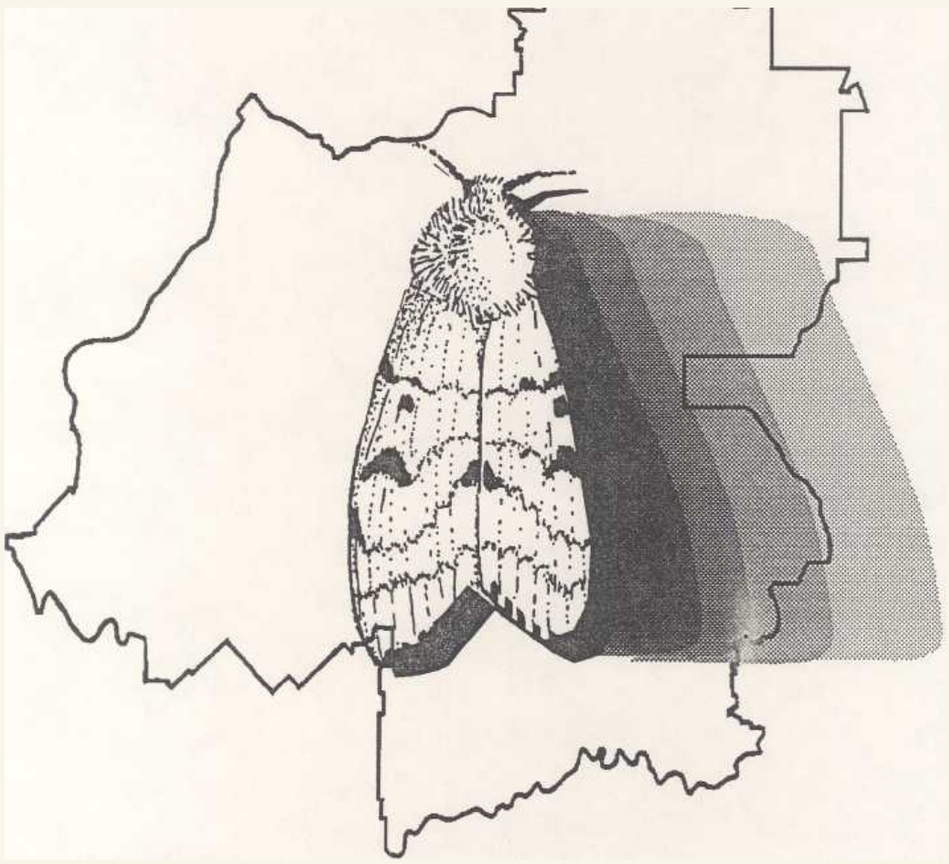
# BIOLOGICAL EVALUATION
# OF GYPSY MOTH POPULATIONS,
# ALLEGHENY NATIONAL FOREST, PENNSYLVANIA
# 1991



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# BIOLOGICAL EVALUATION
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## SUMMARY

Gypsy moth egg mass densities have again increased within most of the Allegheny National Forest (ANF). Several areas have population densities which approach, or exceed, minimum thresholds for spraying. Within individual Opportunity Areas (OAs), average egg mass densities ranged from 74 to 2174 egg masses per acre. Most averages for entire OAs are below minimum threshold levels; however, specific areas within several of the OAs have densities of 250-3520 egg masses per acre which meet, or exceed, minimum levels.

Areas of potentially defoliating populations should be considered for spraying during the spring of 1992 to prevent additional tree mortality, nuisance, and to maintain species diversity for wildlife.

## INTRODUCTION AND BACKGROUND

Moderate defoliation was once again detected on the Allegheny National Forest in 1991. During the six year period from 1984-1990, just over 210,000 acres were defoliated by the gypsy moth. As a result of the defoliation, substantial oak tree mortality, and subsequent salvage sales, have occurred within the Sheffield, Bradford, and Marienville Ranger Districts. Also there is concern among land managers on the ANF as to the affects of the mortality on the way the oak forest type should be managed. Tree mortality has also forced FHP to alter the location and process in which the oak forest type is sampled to estimate gypsy moth populations.

Originally, only high value timber stands and developed recreation sites were considered when planning ANF suppression projects. Following the oak mortality of 1988, priorities for selecting spray blocks are now based on maintaining the overall tree species diversity throughout the Forest.

## OBJECTIVES

The objectives of this biological evaluation were to accurately estimate gypsy moth population densities.

## SURVEY PROCEDURES

During this year's survey, 1 /40th acre plots were used to estimate egg mass densities within only the highest priority opportunity areas. Only high priority OA's were surveyed due to manpower and time limitations. However, it will be possible to survey additional high priority areas with low priority OA's if necessary during the 1992 Suppression Planning process. Map 1 of Appendix A presents the opportunity areas on the Allegheny National Forest.

The number of 1 /40th acre plots that were distributed throughout any given Opportunity Area depended upon the total acreage of susceptible forest type in that OA. At each survey point, a range pole with a target at 5 feet was placed at plot center; the survey then used a 10 BAF prism to sight on the target and establish an 18.6 foot radius plot boundary. An imaginary cylinder was extended from the ground through the canopy and all egg masses within this cylinder are tallied. An average of the plot counts was multiplied by 40 (blow-up factor for 1/40th acre plot) to determine the egg mass density per acre for the Opportunity Area.

Additional information taken at these sample plots included the approximate percentage of oak in the stand by percent cover to help interpret variations in egg mass counts. Also, the general size of the egg masses and the presence of parasites (Ooencyrtus wasps) on the egg masses were noted as an indication of gypsy moth population health and whether it is declining or increasing.

The linear relationship between egg mass density and defoliation of host type have been published by David Gansner, NEFES, Radnor, PA, and were used to predict the potential 1991 defoliation; greater than 750 egg masses per acre can be expected to cause moderate defoliation (30-60 percent) and greater than 1500 egg masses per acre can result in severe defoliation (60-100 percent). In past projects, densities of 250 and 500 egg masses per acre have been used as minimum thresholds for treatment within developed recreation sites and visual corridors respectively.

## RESULTS AND CONCLUSIONS

Gypsy moth populations have increased substantially within several OA's on the Allegheny National Forest. Average per acre egg mass densities in the general OA survey ranged from 74 in M5M to 2174 in M1 L. Average per acre values are presented for each of the Opportunity Areas in Table 1.

**Table 1.-- 1991 Gypsy moth egg mass survey results, Allegheny National Forest.**

| OA | Average EM/A | Range | Egg Mass Size | Approx. % Oak on Plots | % of Plots with Parasites | 1991-92 Population Trend |
|---|---|---|---|---|---|---|
| BIM | 365 | 0-3520 | Large | 31 | 88 | Increasing |
| B2M | 137 | 0-1800 | Large | 41 | 10 | Increasing |
| B3M | 150 | 0-3520 | Large | 40 | 27 | Increasing |
| Ml L | 2174 | 0-6440 | Med/Large | 63 | 96 | Increasing |
| M12M | 680 | 40-2800 | Med/Large | 51 | 62 | Increasing |
| M5M | 74 | 0-280 | Medium | 31 | 27 | Increasing |
| M4H | 258 | 0-680 | Med/Large | 29 | 88 | Increasing |
| M12M | 260 | 0-960 | Large | 44 | 20 | Increasing |
| S4H | 388 | 0-2680 | Med/Large | 56 | 35 | Increasing |
| S16M | 830 | 0-5480 | Large | 43 | 48 | Increasing |
| S14M | 96 | 0-360 | Large | 61 | 25 | Decreasing |
| S15H | 347 | 0-2720 | Large | 47 | 80 | Increasing |

Two Opportunity Areas, MI L and S16M, have overall average egg mass densities which exceed the minimum threshold for moderate to severe defoliation. Although egg mass densities within the remaining OA's are below threshold levels for each OA as a whole, isolated "hotspots" exist where egg mass densities meet, or exceed, minimum suppression thresholds. A good example of this situation occurs in OA B3M which has an overall average egg mass density of only 15 em/acre. However, several of the recreation areas including: Jakes Rocks (2880 em/ac); Kinzua Beach (420 em/ac); Morrison Run (840 em/ac); and Rim Rock (250 em/ac) have egg mass densities which exceed thresholds for nuisance, visual damage, and/or moderate defoliation. The average and range of defoliation potential for each of the opportunity areas is shown in Table 2.

**Table 2.--1992 Gypsy moth outbreak predictions, Allegheny National Forest.**

| OA | **Compartment Numbers** | **Net Acreage** | **Average Est.Defoliation** | Range |
|---|---|---|---|---|
| B1M | 1-8 | 6,840 | Light | Very Light/Severe |
| B2M | 1,18,20-24,27,29,32,41-44, 46,48 | 12,880 | Light | Very Light/Severe |
| B3M | 9-17,41,46-48,50-58,76,78, 79,86,87,90,92,100 | 28,240 | Light | Light/Severe |
| M1L | 1-6,11,15,16,18 | 7, 323 | Severe | Light/Severe |
| M12M | 55,62,65,66,104,106 | 3,760 | Light/Moderate | Light/Severe |
| M5M | 20,22,25-28 | 4,960 | Very Light | Very Light/Light |
| M4H | 22-24,27-31,33-35,38 | 6,800 | Light | Very Light/Light |
| M12M* | 105,107,109-114 | 9,717 | Light | Light/Moderate |
| S4H | 4-9,18-24,28,29 | 11,400 | Light | Light/Severe |
| S16M | 1-4,6,25,27,49-51,81-84, 128-138,144,146-148 | 13,680 | Moderate | Light/Severe |
| S14M | 3,28,48,53-55,76-78 | 6,320 | Light | Very Light/Light |
| S15H | 89,120-122,135,136,138-141, 145,150-154 | 11,840 | Light | Light/Severe |
| | | | | Light/Severe |

*Ridgway Ranger District

Maps 2-13, Appendix A, show the individual Opportunity Areas with shading to represent different population densities. Unshaded areas represent populations less than 250 egg masses/acre.

Although population densities are increasing rapidly, the vigor of the population seems to be decreasing slightly. This year's egg masses were somewhat smaller (medium/large as compared to large egg masses in 1990) and parasitism has increased to approximately 50 percent with last year's average being only 14 percent.

Due to the substantial upward shift in gypsy moth population densities, the localized "hotspots" that exist, and the past history of gypsy moth on the Allegheny National Forest, suppression should be considered for FY 92. In addition, yearly detection and evaluation monitoring needs to be continued to insure that increasing populations are detected.

## TREATMENT ALTERNATIVES

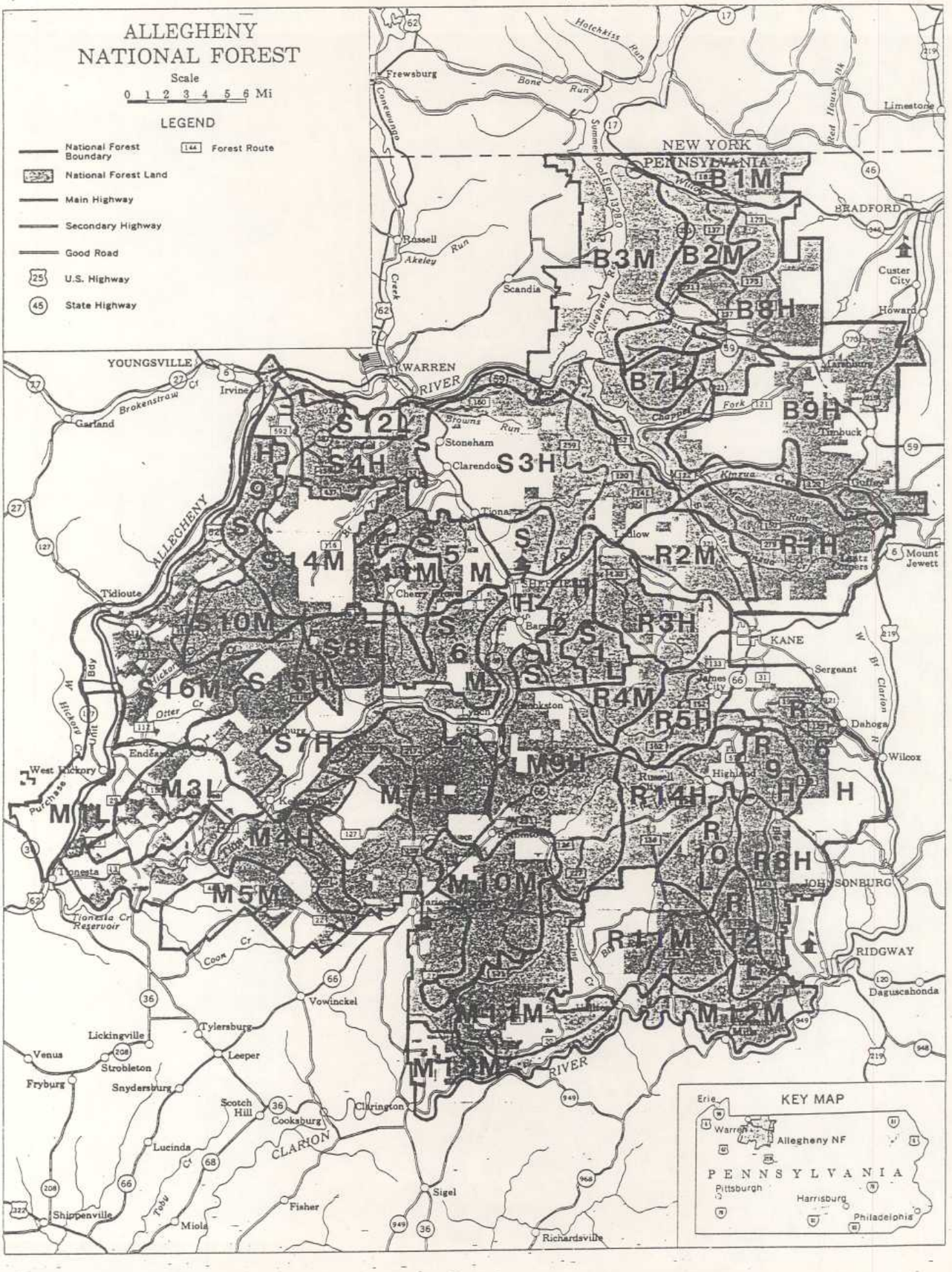
Potentially damaging gypsy moth populations exist within 13 of the opportunity areas on the Forest and occur within stands managed for their tree species diversity, timber, and recreation. Basically, the ANF managers have two options:

1) no action
2) spray in selected areas to prevent nuisance, defoliation, and subsequent tree morality

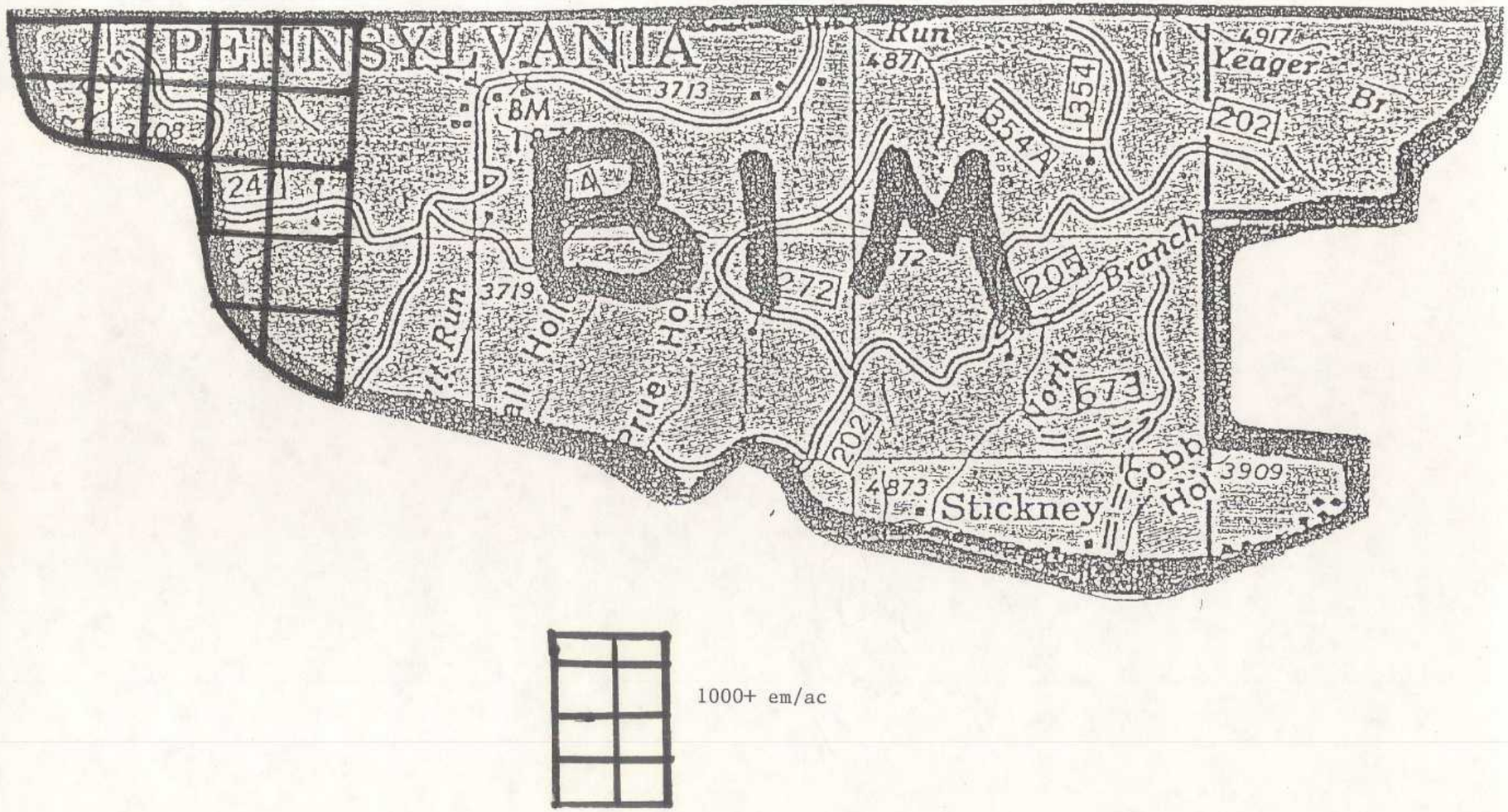
If the no action alternative is chosen, the potential exists for nuisance and moderate defoliation in isolated areas across the ANF. Although research has shown that second outbreak episodes of gypsy moth result in reduced tree mortality rates, the Allegheny National Forest may not want to gamble on additional oak mortality occurring in previously defoliated stand. For this reason, consideration should be given to the suppression alternative. Forest resource values such as recreation, timber, and tree species diversity would be protected by suppressing building gypsy moth populations rather than waiting until a large scale outbreak develops.

# APPENDIX A

Map 1. Opportunity Areas, Allegheny National Forest

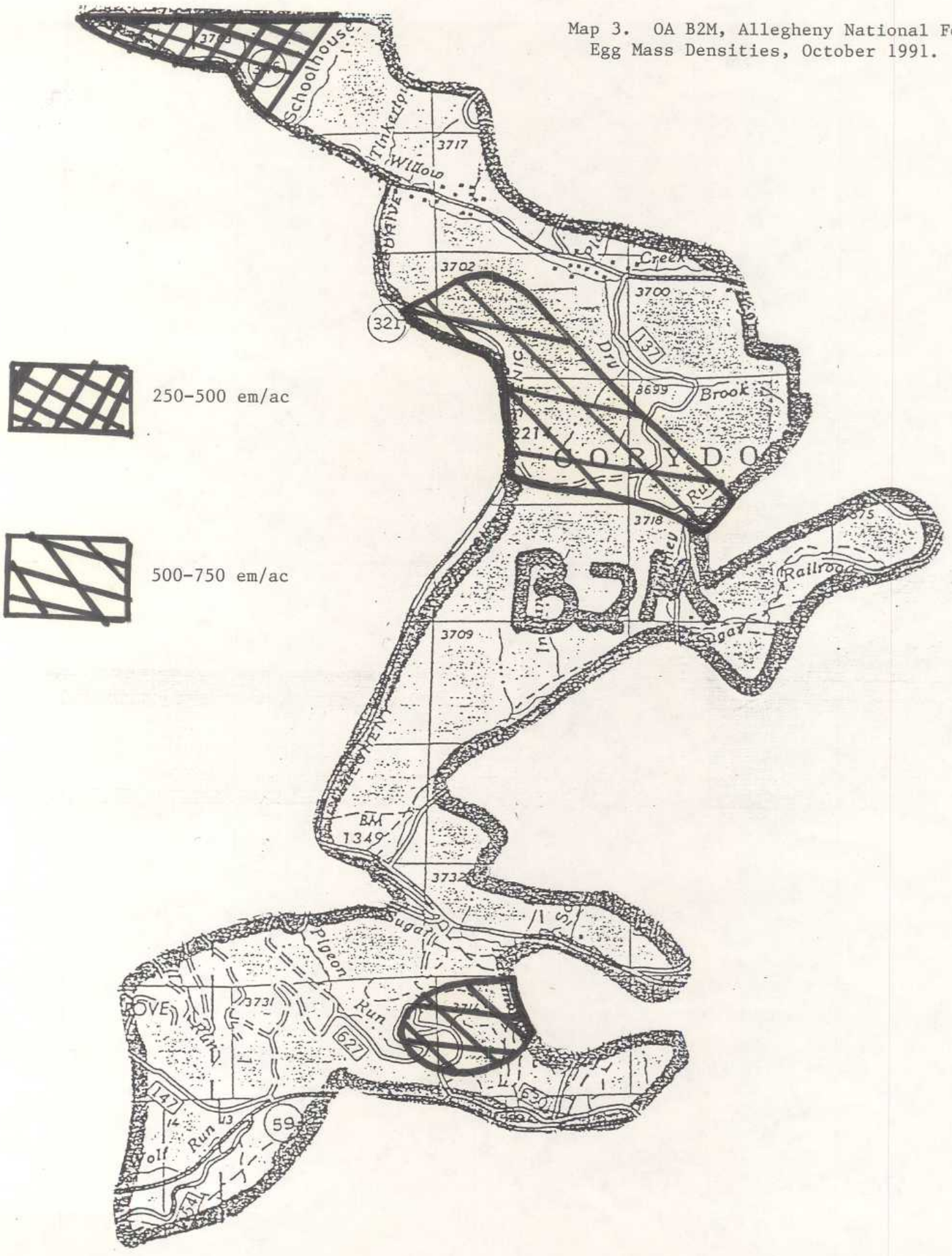


Map 2. OA BlM, Allegheny National Forest,
Egg Mass Densities, October 1991.

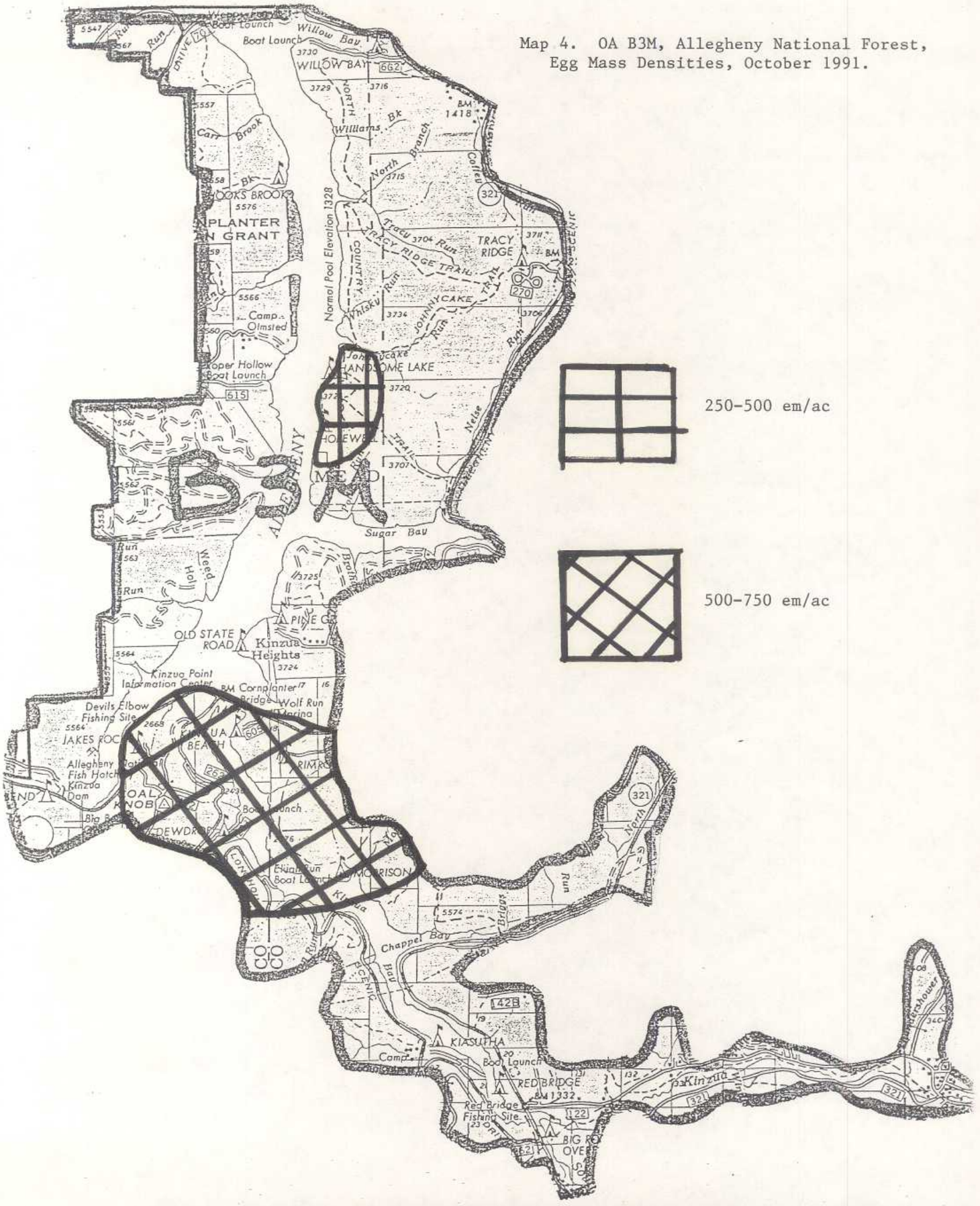



1000+ em/ac

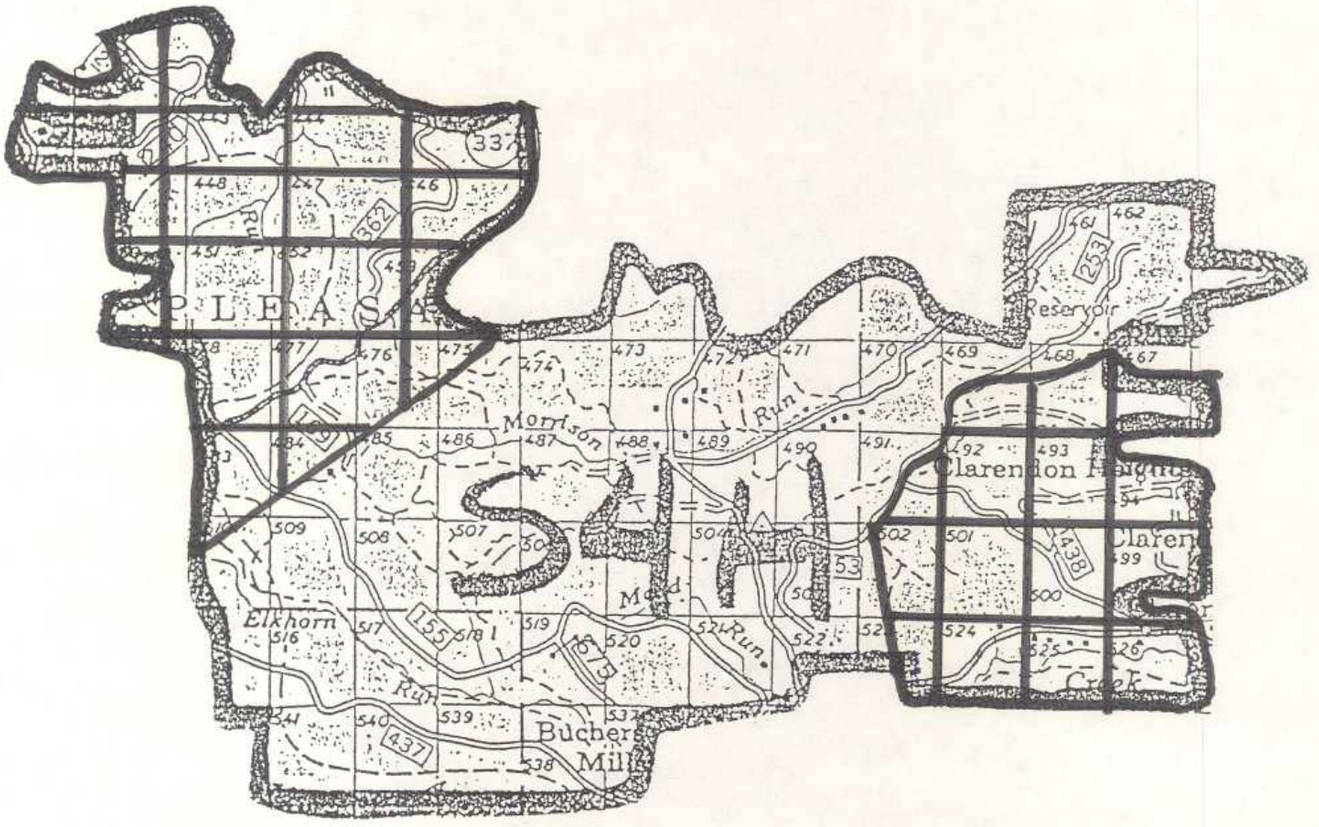
Map 3. OA B2M, Allegheny National Forest,
Egg Mass Densities, October 1991.



Map 4. OA B3M, Allegheny National Forest, Egg Mass Densities, October 1991.

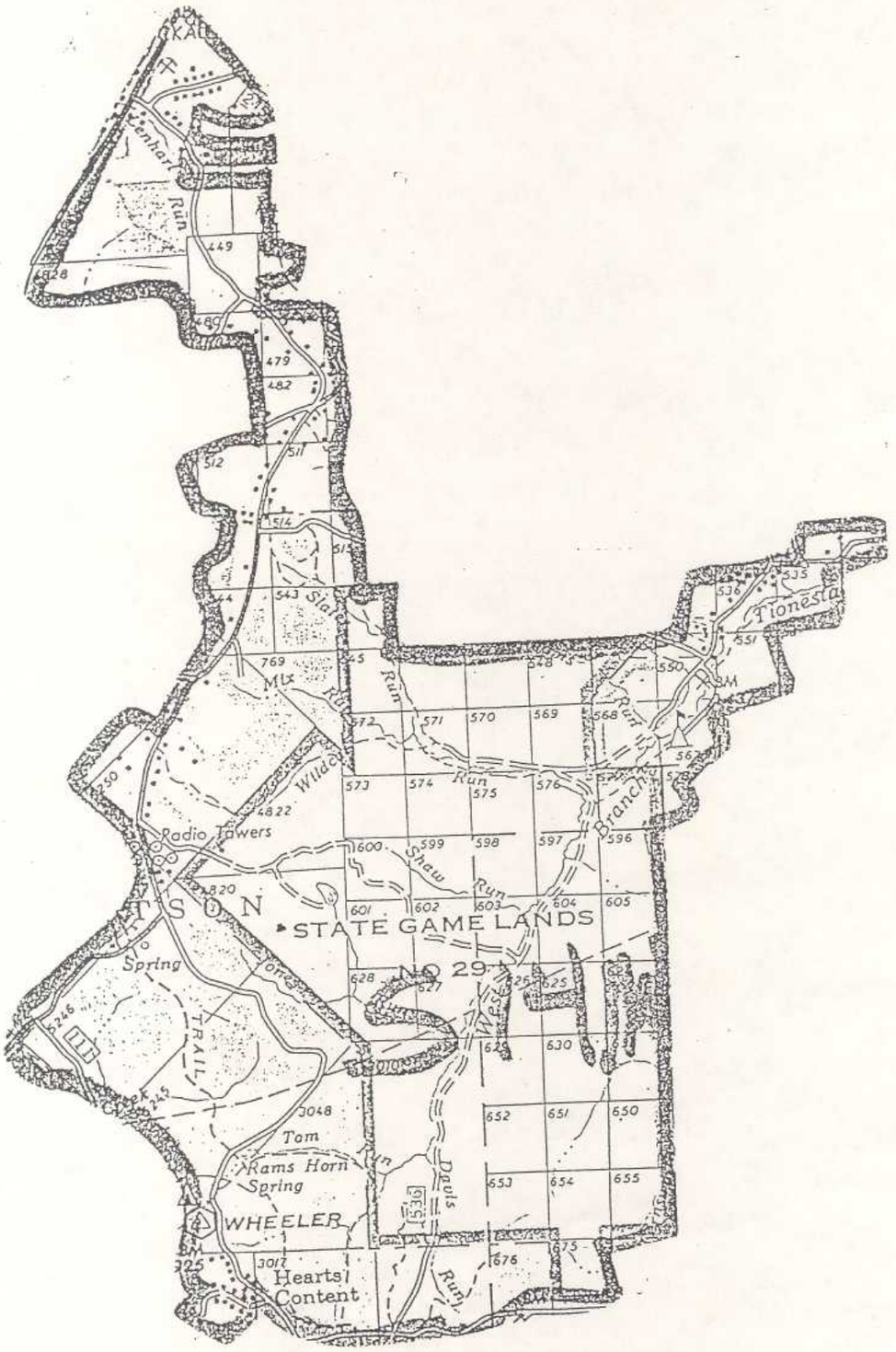


Map 5. OA S4H, Allegheny National Forest,
Egg Mass Densities, October 1991.

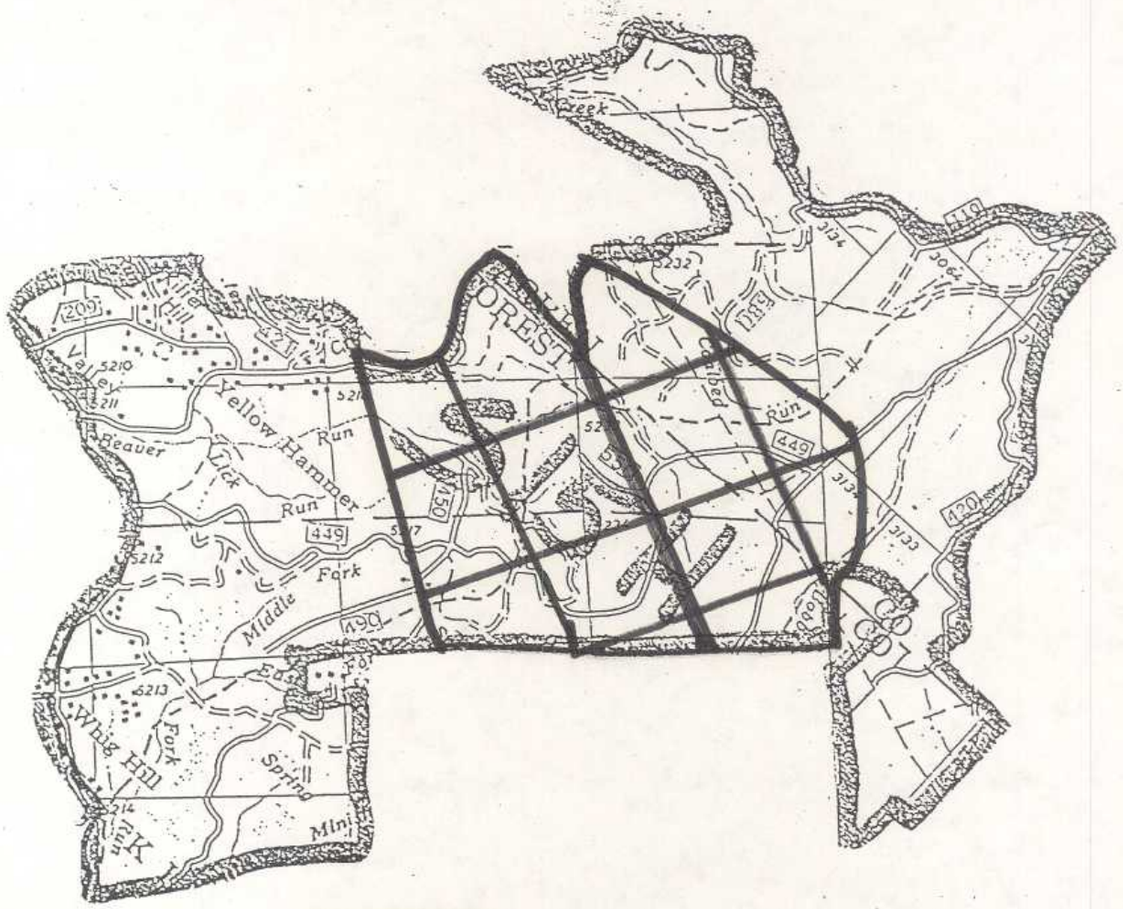



750+ em/ac

Map 6. OA S14M, Allegheny National Forest,
Egg Mass Densities, October 1991.



Map 7. OA S15H, Allegheny National Forest,
Egg Mass Densities, October 1991.

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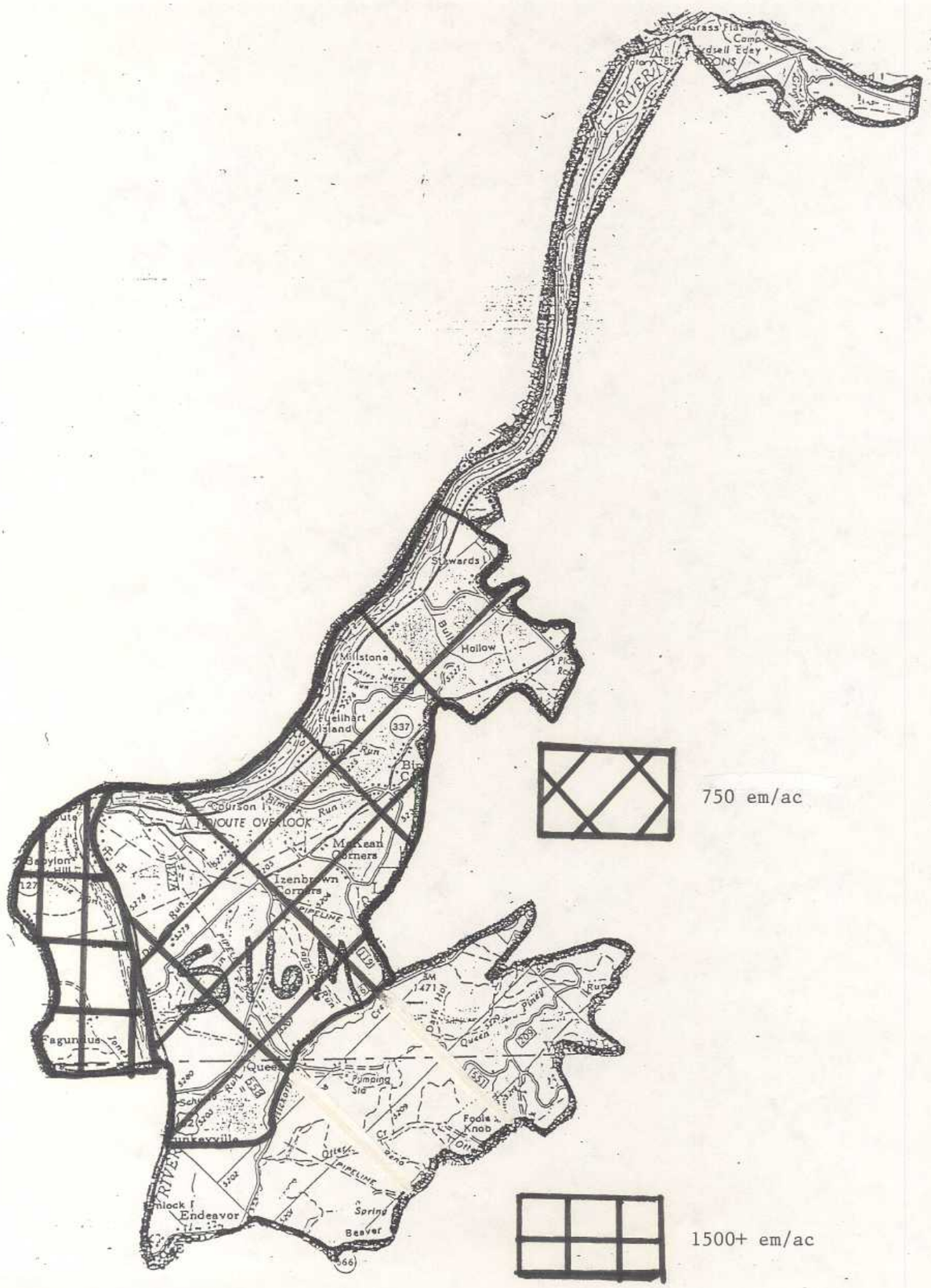
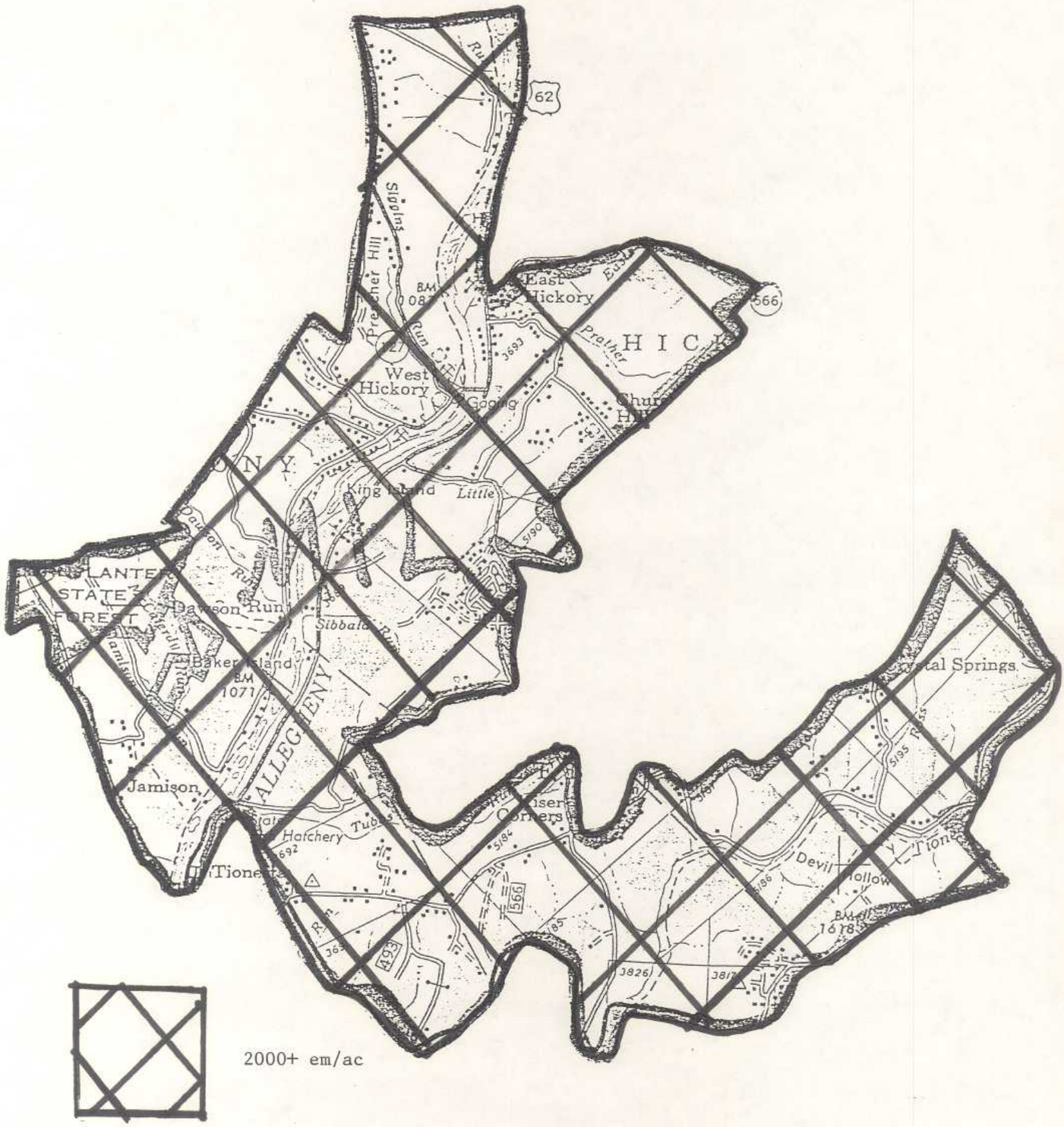
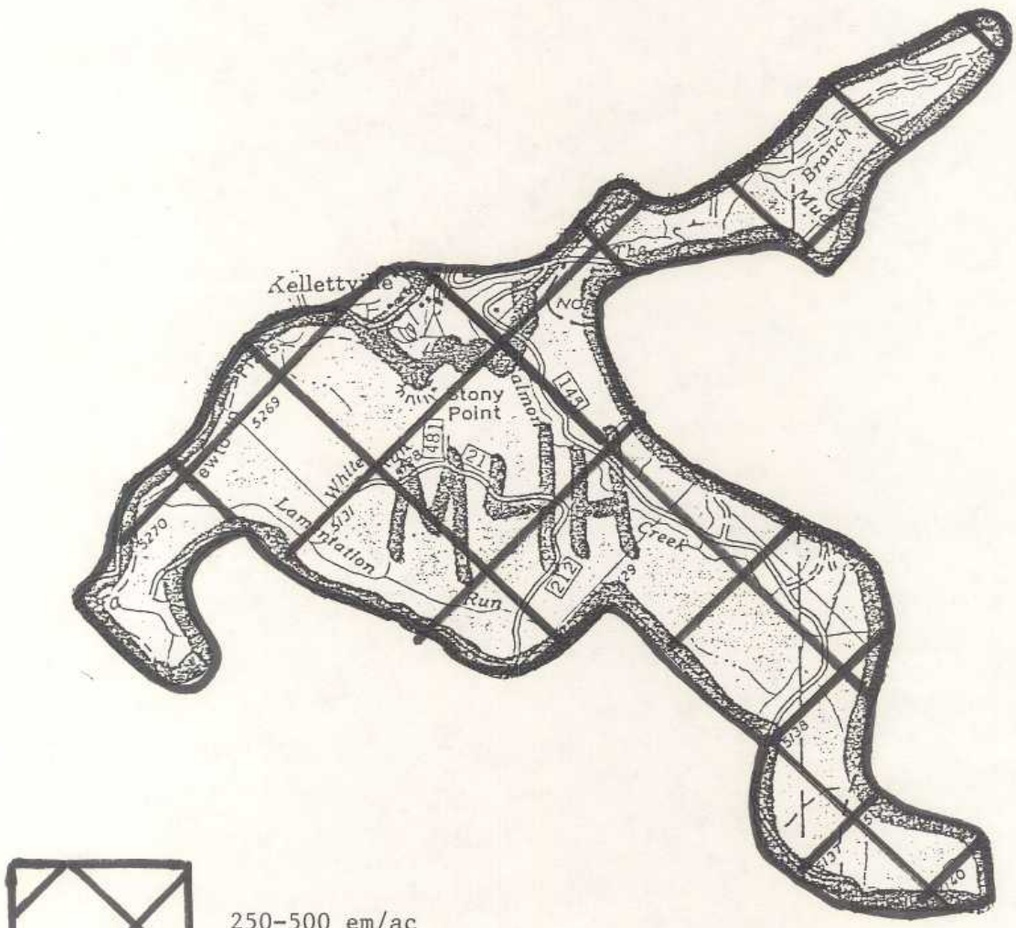
Map 8. OA S16M, Allegheny National Forest,
Egg Mass Densities, October 1991.



Map 9. OA M1L, Allegheny National Forest,
Egg Mass Densities, October, 1991.

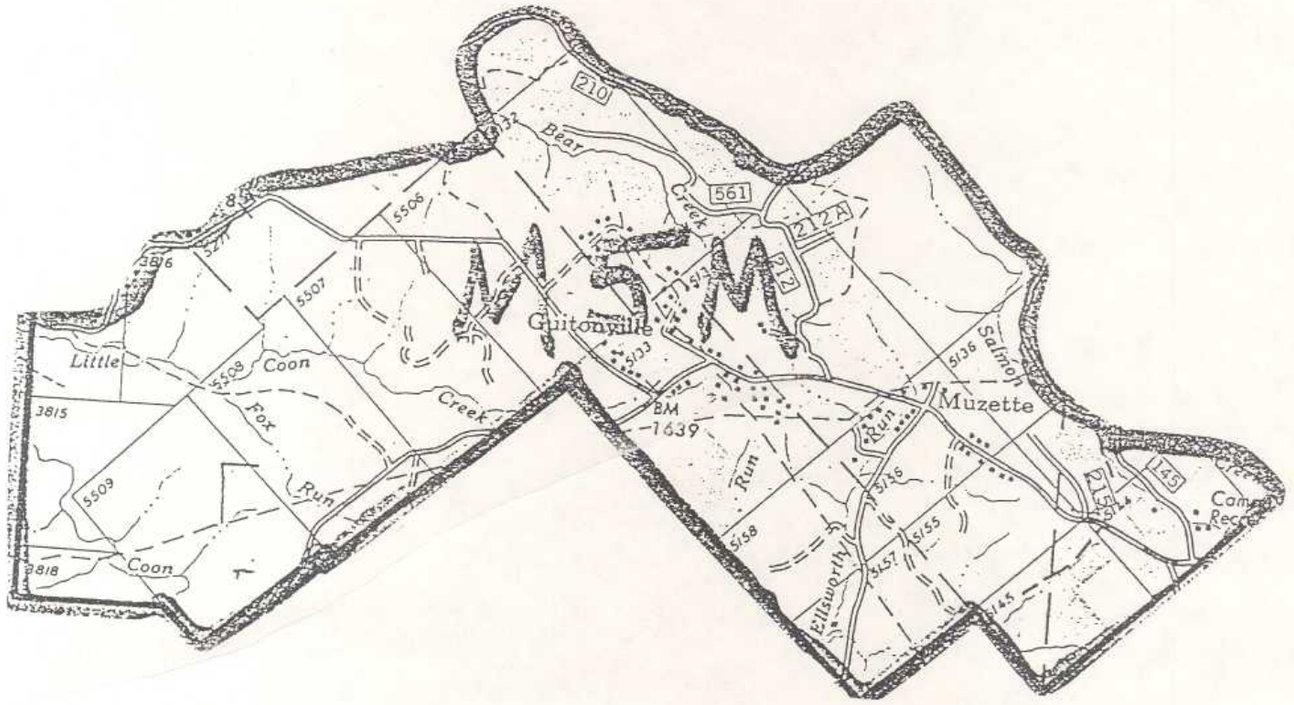


Map 10. OA M4H, Allegheny National Forest,
Egg Mass Densities, October 1991.

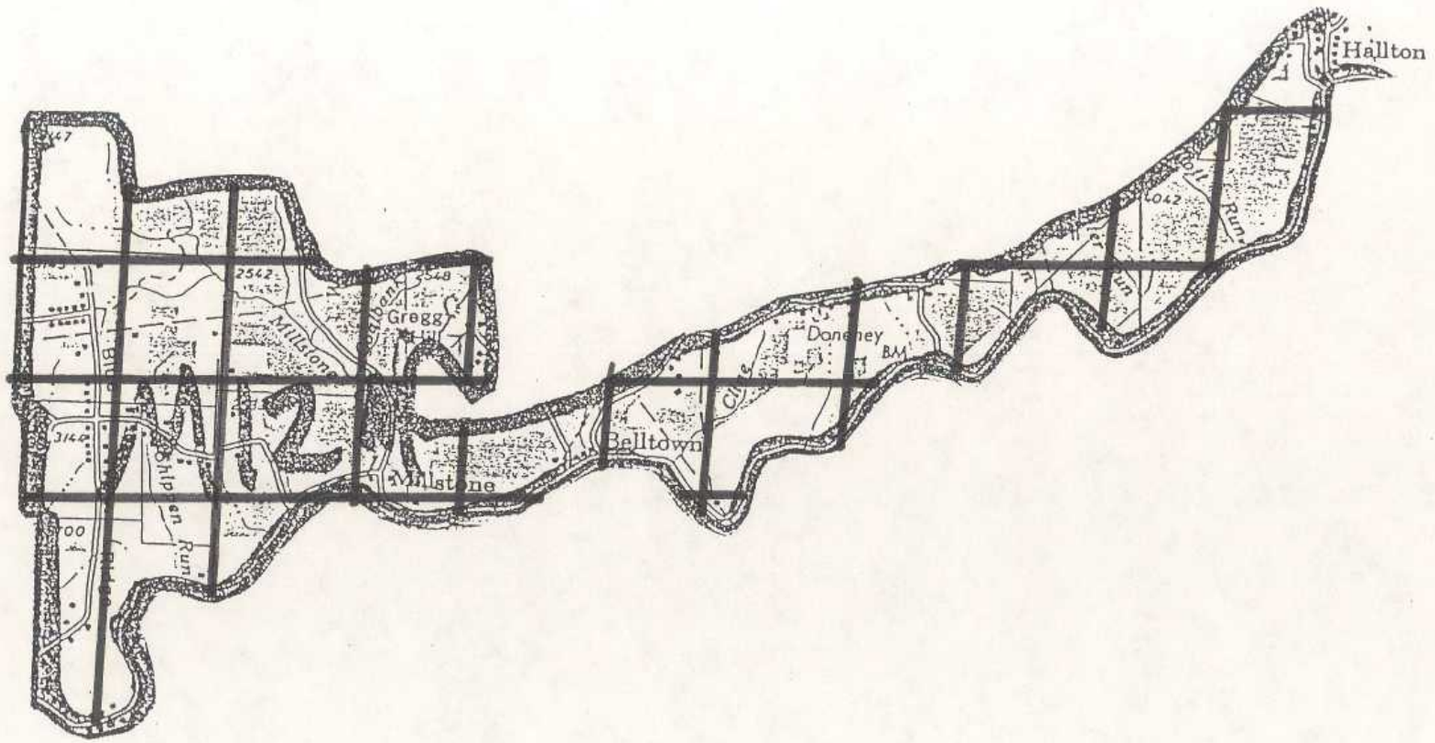



250-500 em/ac

Map 11. OA M5M, Allegheny National Forest,
Egg Mass Densities, October 1991.



Map 12. OA M12M (Marienville RD), Allegheny National Forest,
Egg Mass Densities, October 1991.

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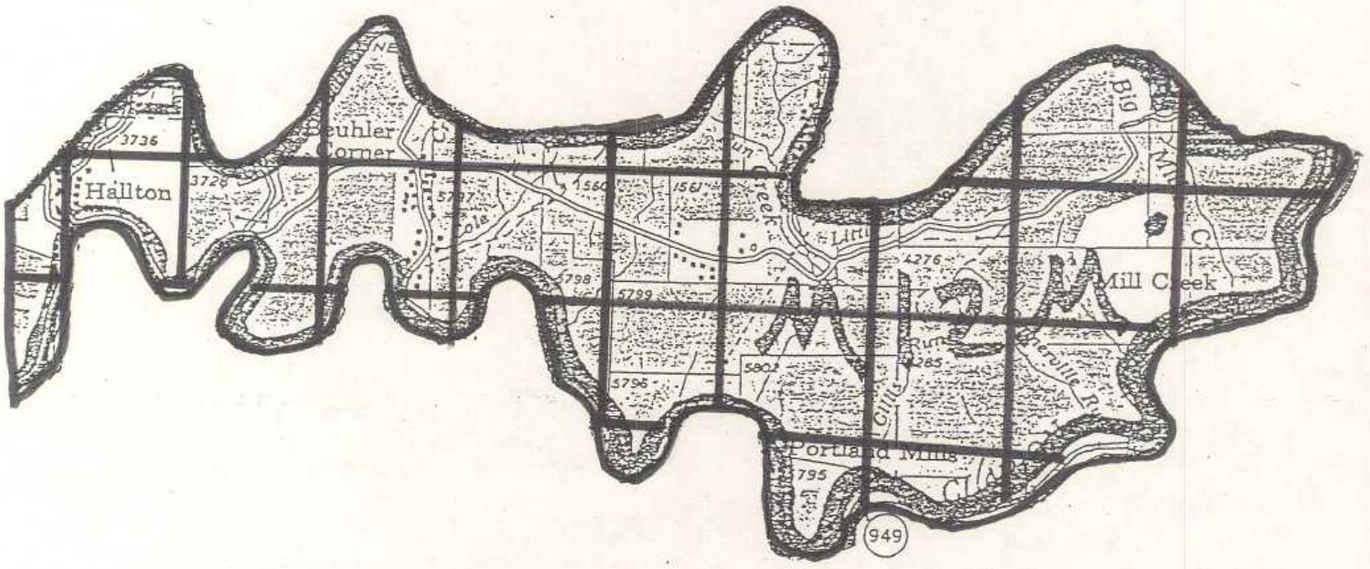
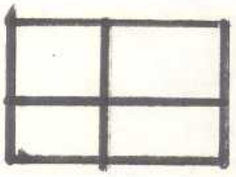
Map 13. OA M12M (Ridgway RD), Allegheny National Forest,
Egg Mass Densities, October 1991.



250-500 em/ac

United States Department of Agriculture | Forest Service | NA | *MFO*

Reply to: 3420 October 1, 1991

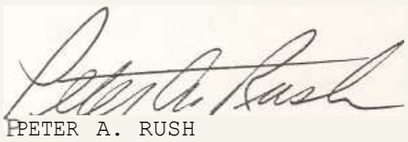
Subject: Gypsy Moth Biological Evaluation - Allegheny National Forest

To: Forest Supervisor, Allegheny National Forest

Enclosed is the "Biological Evaluation of Gypsy Moth Populations, Allegheny National Forest, Pennsylvania, 1991". This report includes gypsy moth egg mass survey results and recommendations for treatment in 1992.

Gypsy moth populations are increasing throughout the Allegheny National Forest and it looks like suppression activities may be warranted for the spring of 1992.

A meeting should be scheduled to discuss the results and implications of this survey. If you have any questions concerning this survey, please give me a call. We appreciate your cooperation and assistance with our pest management activities and are looking forward to working with the Allegheny National Forest staff in the coming year.



PETER A. RUSH
Field Representative
Forest Health Protection

Enclosure

cc: AO
District Ranger, Bradford RD
District Ranger, Marienville RD
District Ranger, Ridgway RD
District Ranger, Sheffield RD
B. Towers, PA DER-BOF
S. Stout, Warren

KSR/mae